How to Buy an Energy-Efficient Residential Refrigerator

Energy Efficiency and Renewable Energy
Federal Energy Management Program

Why Agencies Should Buy Efficient Products

- *Executive Order 13123 and FAR part 23.704 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE* ENERGY STAR® *product labeling program.*
- *Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.*
- *As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.*

Federal Supply Source:

- General Services Administration (GSA)
  Phone: (816) 926-6760
  www.fss.gsa.gov
  www.gsaadvantage.gov
- Defense Logistics Agency (DLA)
  Phone: (800) DLA-2852 or (215) 737-7950
  www.dla.mil
  www.emall.dla.mil

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
  Phone: (800) 363-3732
  www.eere.energy.gov/femp/procurement
- ENERGY STAR has an online list of products that meet this recommendation.
  Phone: (800) 363-3732
  www.energystar.gov
- American Council for an Energy-Efficient Economy (ACEEE) publishes the *Consumer Guide to Home Energy Savings* which has a chapter on food storage.
  Phone: (202) 429-0063
  www.aceee.org
- Consumers Union publishes *Consumer Reports* magazine and the *Consumer Reports Annual Buying Guide*.
  Phone: (800) 500-9760
  www.consumerreports.org
- *Home Energy* magazine provides energy conservation tips for residential appliances.
  Phone: (510) 524-5405
  www.homeenergy.org
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
  Phone: (202) 646-7950

Efficiency Recommendation

Refrigerator Type	Total Volume[a]	Annual Energy Consumption	
		Recommended	Best Available[b]
Single-Door Manual	≤ 2.4 cu. ft.	255 kWh or less	253 kWh
Single-Door Manual	2.5 - 4.4 cu. ft.	275 kWh or less	262 kWh
Single-Door Manual	4.5 - 6.4 cu. ft.	295 kWh or less	240 kWh
Single-Door Manual	≥ 6.5 cu. ft.	315 kWh or less	230 kWh
Single-Door Automatic	≤ 2.4 cu. ft.	305 kWh or less	--
Single-Door Automatic	2.5 - 4.4 cu. ft.	325 kWh or less	307 kWh
Single-Door Automatic	4.5 - 6.4 cu. ft.	345 kWh or less	305 kWh
Single-Door Automatic	≥ 6.5 cu. ft.	365 kWh or less	247 kWh
Bottom-Mount Freezer	≤ 18.4 cu. ft.	475 kWh or less	472 kWh
Bottom-Mount Freezer	18.5 - 20.4 cu. ft.	485 kWh or less	440 kWh
Bottom-Mount Freezer	≥ 20.5 cu. ft.	495 kWh or less	475 kWh
Top-Mount Freezer	≤ 8.4 cu. ft.	320 kWh or less	290 kWh
Top-Mount Freezer	8.5 - 10.4 cu. ft.	340 kWh or less	331 kWh
Top-Mount Freezer	10.5 - 12.4 cu. ft.	360 kWh or less	--
Top-Mount Freezer	12.5 - 14.4 cu. ft.	380 kWh or less	--
Top-Mount Freezer	14.5 - 16.4 cu. ft.	400 kWh or less	372 kWh
Top-Mount Freezer	16.5 - 18.4 cu. ft.	420 kWh or less	412 kWh
Top-Mount Freezer	18.5 - 20.4 cu. ft.	440 kWh or less	392 kWh
Top-Mount Freezer	20.5 - 22.4 cu. ft.	460 kWh or less	428 kWh
Top-Mount Freezer	22.5 - 24.4 cu. ft.	480 kWh or less	--
Top-Mount Freezer	≥ 24.5 cu. ft.	500 kWh or less	506 kWh
Side-by-Side Freezer	≤ 20.4 cu. ft.	560 kWh or less	--
Side-by-Side Freezer	20.5 - 22.4 cu. ft.	580 kWh or less	540 kWh
Side-by-Side Freezer	22.5 - 24.4 cu. ft.	600 kWh or less	593 kWh
Side-by-Side Freezer	≥ 24.5 cu. ft.	620 kWh or less	561 kWh

a) Total volume is the sum of refrigerator and freezer volumes. Annual Energy Consumption is based on DOE test procedure.

b) "--" indicates that data are not available on models exceeding the current national efficiency standard.

Where to Find Energy-Efficient Refrigerators

Energy-efficient residential refrigerators are available through both federal supply sources. The General Services Administration offers them through its Multiple Awards Schedules and on-line shopping network, *GSA Advantage!* The Defense Logistics Agency sells them through the Defense Supply Center in Philadelphia and online through *DoD EMall*. Look for products that qualify for the EPA/DOE ENERGY STAR® label (see "For More Information"), all of which meet the recommended levels. For products that don't display the ENERGY STAR, look at the yellow EnergyGuide label to identify models with an estimated annual energy use that meets these Efficiency Recommendations. For a contractor-supplied refrigerator, specify an estimated annual energy use that meets the recommended efficiency level for the refrigerator type and size.

Size and Type Selection

Select a refrigerator size that is appropriate for the number of people and level of use in your office suite, household, etc. Choosing an oversized refrigerator will increase purchase cost and also waste energy. Because side-by-side refrigerator-freezers and products with through-the-door ice typically use more energy than other models, federal buyers should avoid these features.

Early Replacement

Due to the effective development and implementation of federal appliance standards, refrigerators made today are substantially more efficient then those made 10 to 15 years ago. Replacing refrigerators that are 15 years or older with new models will result in substantial energy and cost savings. For example, 18 cubic foot refrigerators made in 1990 use 940 kWh and cost $56 per year to operate. The same refrigerators today use 420 kWh and cost $26 per year to operate. Early replacement results in a savings of 520 kWh and $30 per year.

Refrigerator Cost-Effectiveness Example
(18.5 cu. ft., top-mount freezer, automatic defrost)

Performance	Base Model[a]	Recommended Level	Best Available
Annual Energy Use	486 kWh	420 kWh	392 kWh
Annual Energy Cost	$29	$26	$24
Lifetime Energy Cost	$400	$346	$323
Lifetime Energy Cost Savings	–	**$54**	**$77**

a) Annual energy use of the base model meets current national appliance standards, see 10 CFR 430, Sub-Part B, Appendix A1.

Definition

Lifetime Energy Cost is the sum of the discounted value of annual energy costs based on average usage and an assumed refrigerator life of 19 years. Future electricity price trends and a discount rate of 3.0% are based on federal guidelines (effective from April, 2004 to March, 2005).

Cost-Effectiveness Assumptions

Annual energy use in this example is based on the standard DOE test procedure for a top-mount freezer model with automatic defrost. The assumed electricity price is 6¢/kWh, the federal average electricity price (including demand charges) in the U.S.

Using the Cost-Effectiveness Table

In the example above, the recommended refrigerator with an annual energy consumption of 420 kWh is cost effective if its purchase price is no more than $54 above the price of the Base Model. The Best Available model, with an annual energy use of 392 kWh, is cost-effective if its price is no more than $77 above the price of the Base Model.

Metric Conversion

1 cubic foot = 28.3 liters

What if my Electricity Price is different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: $\left(\frac{Your\ price\ in\ ¢/kWh}{6.0\ ¢/kWh}\right)$.